



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/980,588	12/04/2001	Hiroyuki Miura	2224-0194P	6379
2292	7590	01/07/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			ANDERSON, REBECCA L	
			ART UNIT	PAPER NUMBER
			1626	

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/980,588

**Applicant(s)**

MIURA ET AL.

**Examiner**

Rebecca L. Anderson

**Art Unit**

1626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004, 9 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 18, 36 and 37 is/are pending in the application.
- 4a) Of the above claim(s) 36 and 37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

Claims 1-3, 18, 36 and 37 are currently pending in the instant application.

Claims 1-3 and 18 are rejected and claims 36 and 37 are withdrawn from consideration as being for non-elected subject matter.

### ***Election/Restrictions***

In the response filed 17 January 2003, Applicant elected to prosecute Group I, claims 1(in part), 2-3, 18 and 34 (in part) drawn to the process for separating a reaction product and an imide compound from a reaction mixture which comprises (A1) a solvent crystallization step. The office action mailed 19 March 2003 finalized the restriction requirement. Applicants newly added claims 36 and 37 are drawn to processes for the separation of a reaction product and an imide compound from a reaction mixture which comprises a solvent crystallization step wherein the substrate is reacted in the additional presence of a co-catalyst, which corresponds to the invention of Group X of the restriction requirement mailed 17 December 2002. Therefore, claims 36 and 37 are not within the elected invention and are withdrawn from consideration as being for non-elected subject matter.

### ***Response to Applicants Amendments and Arguments***

Applicants amendments to claim 1 by including what the substrate is reacted with in the presence of the catalyst has overcome the rejections of claims 1-3 and 18 under 35 USC 112 second paragraph as being indefinite and as being incomplete for omitting essential steps. The amendment to claim 1 by including the vi reactions, i.e. oxidizing

Art Unit: 1626

the substrate with oxygen, etc., has overcome the 35 USC 112 first paragraph rejection of claims 1-3 and 18.

Applicants amendment to claim 1 by including a substrate list and a proviso has not overcome the 35 USC 102(b) rejection of claims 1-3 and 18.

In regards to the 35 USC 102(b) rejection, Applicants' arguments filed 9 September 2004 have been considered, however, they are not found persuasive. Applicant argues that Foricher fails to teach or suggest the reaction of a substrate of the type required by claims 1-3 and 18. Specifically, the substrate of Foricher, the isoprenoids having an allylic hydrogen, have no meaningful relationship-in chemical structure or properties- to the substrates recited in claims 1-3 and 18. Applicants arguments are not found persuasive because an isoprenoid having an allylic hydrogen, is still found within applicants instantly claimed invention. Specifically, wherein the substrate of claim 1 is selected from the group consisting of a hydrocarbon....wherein the hydrocarbon is....a saturated or unsaturated alicyclic hydrocarbon....and the unsaturated alicyclic hydrocarbon is....an unsaturated polycyclic hydrocarbon having at least one methylidyne group in either a bridgehead position or junction position or both. Applicants' instant specification discloses on page 27, lines 4-8, that the polycyclic hydrocarbons **such as the condensed polycyclic hydrocarbons and bridged cyclic hydrocarbons** have at least one methylidyne group in the bridgehead positions and/or junction positions. Page 26, lines 1-3, discloses that as bridged cyclic hydrocarbon, there may be mentioned, for example, bicyclic hydrocarbons (e.g., pinane, **pinene**...) and **terpenes**...". Foricher, column 2, lines 66-68 state, "accordingly, isoprenoids

Art Unit: 1626

include the compounds described in greater detail under specific entries, namely hereterpenes, terpenes, ...." Therefore the Foricher reference still anticipates applicants invention since it discloses the process of oxidizing an isoprenoid having at least one allylic hydrogen atom in the presence of a N-hydroxydicarboxylic acid imide of the formula (I) such as N-hydroxyphthalimide. Furthermore, the oxidation of a-pinene is found on columns 5 and 6 of the Foricher reference. Applicant also argues that Foricher fails to teach or suggest a combination of an imide catalyst and a metal co-catalyst required by claims 36 and 37, however, this argument is considered moot since claims 36 and 37 are withdrawn from consideration as being for a non-elected invention. Furthermore, applicants argument of unexpected benefits is not since the rejection is under 35 USC 102(b) as being anticipated by Foricher et al. Foricher et al. discloses a process which falls within the instantly claimed invention which is the process of oxidizing an isoprenoid with at least one allylic hydrogen atom in the presence of a N-hydroxydicarboxylic acid imide of the formula (I), such as N-Hydroxyphthalimide (NHPI) (Table 1, column 9, lines 42-59). The separation of the catalyst from the reaction mixture is disclosed on column 4, lines 50-62, wherein the catalyst can be separated (crystallized-out) from the reaction mixture with the aid of a non-polar solvent, such as hexane.

***Maintained Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The rejection of claims 1-3 and 18 rejected under 35 U.S.C. 102(b) as being anticipated by Foricher et al. as found in the office actions mailed 19 March 2003, 8

Art Unit: 1626

September 2003 and 19 March 2004 is maintained for essentially those reasons as found in the prior office action and below:

The instant application claims a process for separating a reaction product and an imide compound of the formula (1) from a reaction mixture obtained by a reaction of:

**a substrate selected from the group consisting of a hydrocarbon, an alcohol corresponding to the hydrocarbon, an aldehyde corresponding to the hydrocarbon, a ketone corresponding to the hydrocarbon, an amine, a heterocyclic compound, a thiol, a sulfide, and an amide, wherein the hydrocarbon is a saturated or unsaturated aliphatic hydrocarbon which may have a substituent, a saturated or unsaturated alicyclic hydrocarbon which may have a substituent, a condensed cyclic hydrocarbon containing a non-aromatic ring, or an aromatic hydrocarbon in which a methyl group or a methylene group is bound to an aromatic ring, provided that the unsaturated aliphatic hydrocarbon is a conjugate diene and the unsaturated alicyclic hydrocarbon is a cycloalkatriene, a cycloalkatetraene, a dimer of a diene, or an unsaturated polycyclic hydrocarbon having at least one methylidyne group in**

either a bridgehead position or junction position or both, in the presence of the imide compound, which process comprises separating said reaction product and said imide compound from said reaction mixture by solvent-crystallizing the imide compound from said reaction mixture with at least one solvent selected from the group consisting of a hydrocarbon, a chain ether, and water, wherein the reaction mixture is obtained by (i) oxidizing the substrate with oxygen, (ii)-(V) or (vi). Claim 2 claims the process of claim 1 wherein the hydrocarbon of the solvent-crystallization step is an aliphatic hydrocarbon having 4 to 16 carbon atoms or an alicyclic hydrocarbon having 4 to 16 carbon atoms,

Art Unit: 1626

and the chain ether is a diC1-6alkyl ether or a C1-6alkyl C6-10aryl ether. Claim 3 claims the process of claim 2 wherein the imide compound is an aromatic imide compound, and the reaction product is an oxidation reaction product of an alicyclic hydrocarbon or an alicyclic alcohol and is soluble in the solvent for crystallization in the solvent-crystallization step. Claim 18 claims the process of claim 1 wherein the imide compound is an oxidation catalyst for oxidizing the substrate and the reaction product is an oxidation reaction product corresponding to the substrate.

This invention was described in the prior art US Patent No. 5, 030, 739 more than one year prior to the date of the instant application. US Patent No. 5, 030, 739 discloses the process of oxidizing an isoprenoid having at least one allylic hydrogen atom(column 1, lines 39-59), such as terpenes, sesquiterpenes and steroids (column 2, lines 43-57), such as  $\alpha$ -pinene (column 3, lines 28-36) in an inert ketone or ester in the presence of a N-hydroxydicarboxylic acid imide of the formula (I), such as N-Hydroxyphthalimide (NHPI) (Table 1, column 9, lines 42-59). The separation of the catalyst from the reaction mixture is disclosed on column 4, lines 50-62, wherein the catalyst can be separated (crystallized-out) from the reaction mixture with the aid of a non-polar solvent, such as hexane. An example of the oxidation of  $\alpha$ -pinene is found in example b), columns 5 and 6 the imide compound used was NHPI (see experiment (b) in Table 1). Another example of the oxidation of  $\alpha$ -pinene is found in example 4, columns 9-10, wherein  $\alpha$ -pinene is reacted with NHPI and the imide is separated out with hexane/diethyl ether, (i.e. the substrate  $\alpha$ -pinene, an alicyclic hydrocarbon which is soluble in the hexane/diethyl ether solution (as seen by the filtrate being evaporated to

Art Unit: 1626

dryness and the resulting residue containing the final oxidation product), is oxidized with the aromatic oxidation catalyst NHPI and then the catalyst is separated out by a solvent crystallization step with the aid of a solvent mixture of hexane, an alicyclic hydrocarbon having 6 carbon atoms, and diethyl ether, a diC1-6alkyl ether). The prior art substrate is an isoprenoid having at least one allylic hydrogen atom, such as  $\alpha$ -pinene which corresponds to applicants claimed substrate of a hydrocarbon and is not within the proviso because the term "terpene", which is provided out, is instead, within the isoprenoid having one allylic hydrogen atom. This rejection could be overcome, for example, by deleting the substrates "hydrocarbon, alcohols, aldehydes and ketones" from the instant claims.

### Conclusion

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.



Art Unit: 1626

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Rebecca L. Anderson whose telephone number is (571) 272-0696. Mrs. Anderson can normally be reached Monday through Friday 5:30AM to 2:00PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Joseph K. McKane, can be reached at (571) 272-0699.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rebecca Anderson  
Patent Examiner  
Art Unit 1626, Group 1620  
Technology Center 1600

1/4/05



Joseph K. McKane  
Supervisory Patent Examiner  
Art Unit 1626, Group 1620  
Technology Center 1600

**TAOFIQ SOLOLA**  
**PRIMARY EXAMINER**